

Infrastructure Requirements Report

In Response to SEARs Requirements – Air Liquide Nowra CO2 Production Facility

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DOCUMENT CONTROL SHEET

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Issue Number	Issue Date	Nature Of Amendment
Rev -	25th August 2025	Amended and shared for Internal Comment
Rev B	20th November 2025	Amended to reflect raw gas line design changes
Rev C	2nd February 2026	Text Removed from Section 3.3.1
Rev D	26 March 2026	Comments to the effect of minor traffic disruptions have been removed and Section 6 has been amended to include details of the Bolong Rd and Raw Gas line crossing methodology
Rev E	27 March 2026	Revised section 6 and removed references to Easements based on the updated plan.
Rev F	30 March 2026	6.1 Added to detail easements as per the title searches and how the raw gas line will not affect them.

Please mark earlier copies of this document “SUPERSEDED” if needed for reference, otherwise remove from use and destroy in an appropriate manner.

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Executive Summary

This Infrastructure Requirements Report has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARs) for the proposed Air Liquide CO₂ Production Facility at Nowra. The report demonstrates how the project will be supported by reliable, fit-for-purpose utility infrastructure and outlines the strategy for delivery, staging, and management.

Assessment of impacts on existing utility infrastructure and service provider assets

The project site is located within an established industrial zone serviced by Endeavour Energy, Shoalhaven Water, and telecommunications providers. While existing connections from Shoalhaven Starches provide a strong baseline, new dedicated connections and upgrades are required for electrical supply and wastewater handling. Impacts to surrounding networks are expected to be minimal and temporary, with construction activities managed through utility surveys, protection measures, and traffic management (**Sections 2 & 5**).

Description of infrastructure required on-site

The facility requires new on-site utility infrastructure, including:

- Two dedicated 11kV/690V and 11kV/415V transformers and an MCC switchroom for power distribution.
- Potable water connection to the mains supply for office and amenities.
- Wastewater and recycled water pipelines connecting to Shoalhaven Starches treatment infrastructure.
- NBN connection for SCADA and operational monitoring.
- On-site stormwater retention and quality control systems (Section 3).

Details of existing capacity and augmentation needs

The existing services within the Shoalhaven Starches precinct provide a strong foundation but require targeted augmentation. Electrical capacity upgrades and a dedicated wastewater return line are the primary new works. Potable water supply is sufficient, while process water will be recycled wherever possible to reduce demand. No external service constraints have been identified in consultation with Endeavour Energy and Shoalhaven Water (**Section 2.2 & 3**).

Delivery, staging and management of upgrades

Utility works will be delivered in three coordinated stages:

1. Site preparation and relocation of utilities, raw gas line.
2. Installation of underground services and electrical switchrooms.
3. Plant installation, tie-in, and commissioning.

All works will be fully funded and delivered by Air Liquide Australia in consultation with service providers, ensuring timely completion and long-term maintainability (Section 4).

New Infrastructure Requirements

Two new pipeline corridors are required; one for the raw gas line between Shoalhaven Starches and the plant site, and one for the liquid waste return line beneath Bolong Road. Directional drilling will minimise construction impacts. All other infrastructure will be contained within the development boundary. Existing service alignments will be protected during works **(Section 6)**.

Conclusion

The report confirms that the CO₂ Production Facility can be delivered without adverse long-term impacts to existing utilities. Required upgrades are modest, coordinated with service providers, and fully funded by the proponent. The staged delivery approach ensures compliance with SEARs requirements and provides confidence in the project's infrastructure readiness.

Introduction

This Infrastructure Requirements Report has been prepared in response to the Secretary's Environmental Assessment Requirements (SEARs) for the proposed Air Liquide CO Production Facility at Nowra. The report demonstrates how the project will be supported by reliable, fit-for-purpose utility infrastructure and outlines the strategy for delivery, staging, and management.

SEARs Infrastructure Requirements	ALA Response
– an assessment of impacts of the development on existing utility infrastructure and service provider assets surrounding the site	<i>Response in section 2 below, page 6</i>
– a detailed written and/or graphical description of infrastructure required on the site, including any electrical substation/s and on-site switch yard/s	<i>Response in section 3 below, page 8</i>
- details of the existing capacity of the site to service the proposed development and any extension or augmentation, property tenure or staging requirements for the provision of utilities, including arrangements for electrical, drinking water, wastewater and recycled water	<i>See section 3.2 and section 3.3</i>
- a description of how any upgrades will be co-ordinated, funded and delivered on time and be maintained to facilitate the development	See Section 4.3 Coordination, Funding, Timely Delivery, and Maintenance of Upgrades.
- identification of any existing infrastructure or easements on or off the site which may be impacted by construction or operation of the development and details of measures to be implemented to address any impacts.	Section 6.1 details the interaction of the Raw Gas Line with existing infrastructure along Bolong Road and confirms that no impacts are anticipated.
Please clarify. The Infrastructure Requirements Report states that “there is the potential for minor traffic disruptions during construction of the waste water line for 18 weeks”. Please describe the construction method for the proposed directional drill of the wastewater pipeline under Bolong Road, and what traffic disruptions are expected.	Comments to the effect of minor traffic disruptions have been removed and Section 6 has been amended to include details of the Bolong Rd and Raw Gas line crossing methodology

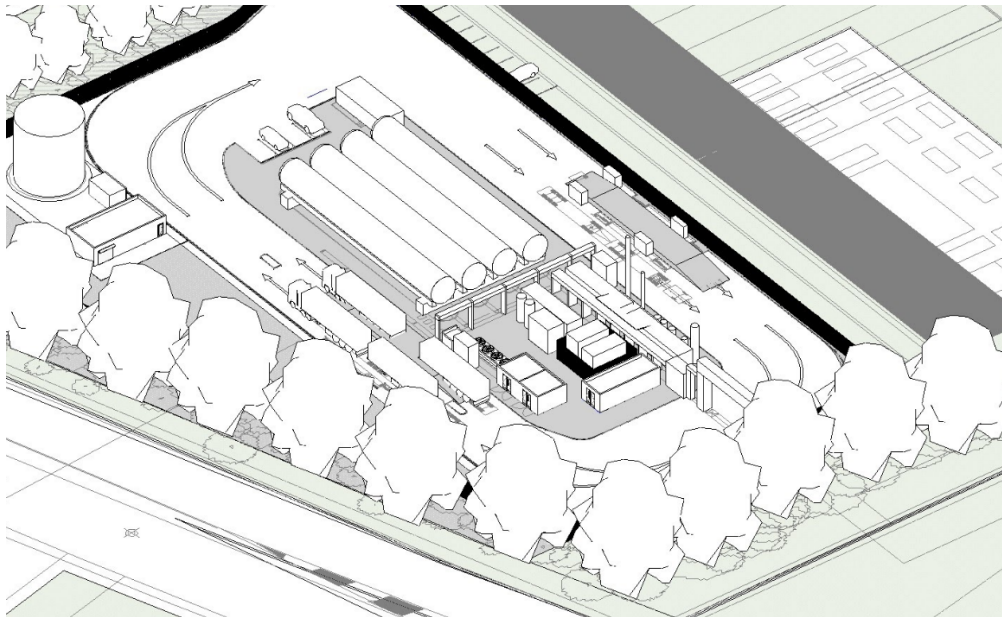


Figure 1, 3D Render of layout

2.0 Assessment of Impacts on Existing Utility Infrastructure (Response to First Line Item as per SEARs)

–an assessment of impacts of the development on existing utility infrastructure and service provider assets surrounding the site

The project site is located within an established industrial zone serviced by Endeavour Energy, Shoalhaven Water, and telecommunications providers. While existing connections from Shoalhaven Starches provide a strong baseline, new dedicated connections and upgrades are required for electrical supply and wastewater handling. Impacts to surrounding networks are expected to be minimal and temporary, with construction activities managed through utility surveys, protection measures, and traffic management (Sections 2 & 5).

2.1 Utility Services in the Surrounding Area

The development site is located in a well-established industrial zone (**E4 – General Industrial**) with access to the following utility services:

- **Electrical:** Nearby Endeavour Energy infrastructure, including an 11kV HV distribution network.
- **Water:** Potable water supplied by Shoalhaven Water, available via local mains.
- **Wastewater:** Existing industrial wastewater pipeline infrastructure servicing Shoalhaven Starches.
- **Telecommunications:** NBN and local fibre and starlink services are available in the area.

- **Stormwater:** Local stormwater management is integrated with on-site drainage infrastructure.

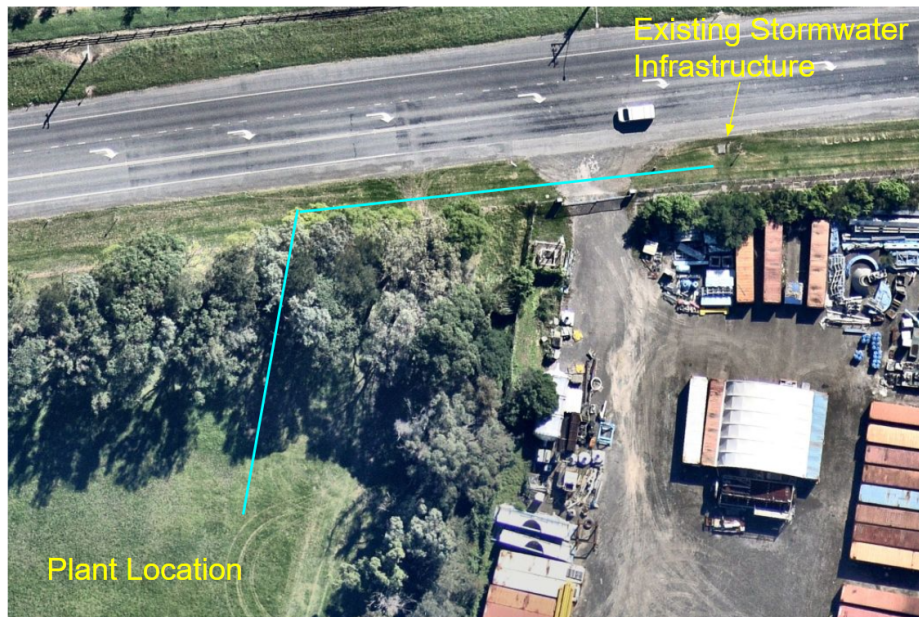


Figure 2, Existing Stormwater Infrastructure

2.2 Site Capacity and Existing Connections

While the site benefits from existing utility connections associated with Shoalhaven Starches, new infrastructure is required to meet the specific demands of the proposed Air Liquide CO₂ plant. This includes an upgrade to the site's electrical capacity and a dedicated pipeline connection to the adjacent wastewater treatment facility.

Potable water will be sourced from the mains supply for use in the office and amenities. However, the facility is designed to prioritise water efficiency, with process water largely recirculated. Excess water expected to be generated by the process will be repurposed for non-potable uses such as washdown, irrigation of landscaping, toilet flushing, and general on-site use.

3. Proposed Infrastructure and Augmentation Works (Response to the Second Line Item as per SEARs)

–a detailed written and/or graphical description of infrastructure required on the site, including any electrical substation/s and on-site switch yard/s

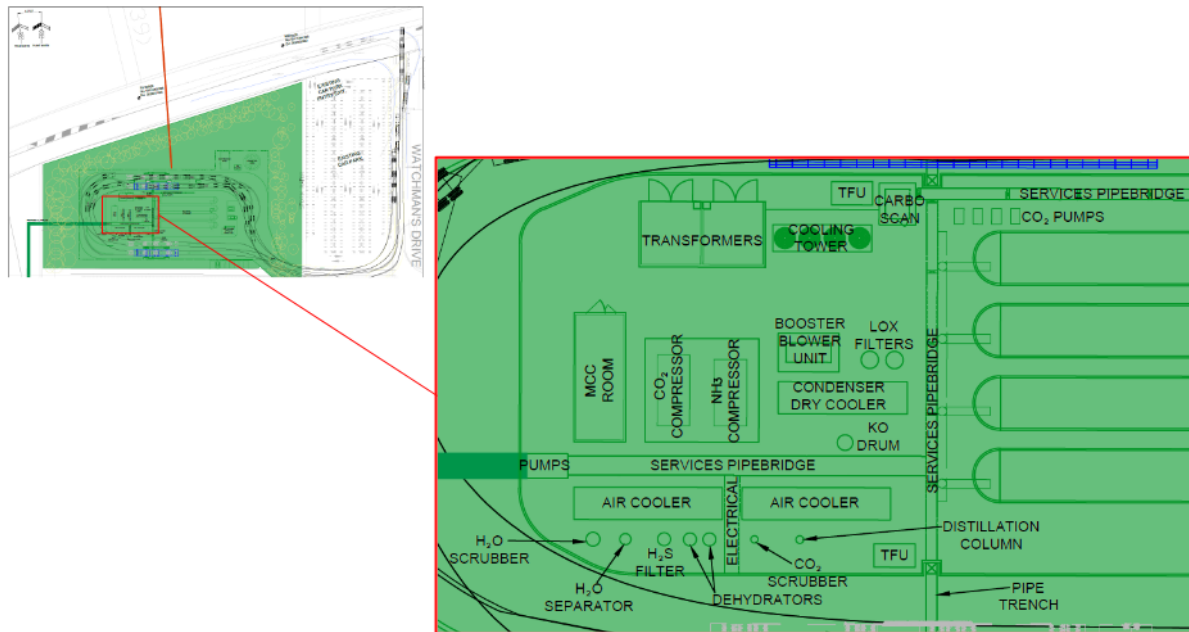


Figure 3, Proposed layout infrastructure arrangement

3.1 Electrical Infrastructure

Electrical loads are expected to include compression, liquefaction, and monitoring systems. Air Liquide is coordinating with Endeavour Energy to ensure adequate HV supply. Applications for connection agreements and works approvals will be submitted to Endeavour Energy and Shoalhaven Water in **Q4 2025**. An electrical tendering package is being prepared for distribution in Q3/Q4 2025. Electrical contractors will be certified in accordance with **AS/NZS 3000:2018 (Wiring Rules)** and hold a valid NSW Electrical Contractor Licence issued by NSW Fair Trading.

The electrical design is typically broken down by scope into the following key areas:

- **Power Supply and Distribution:** Design and installation of transformers (e.g., TX01: 11kV HV/0.690 kV 1500 kVA, TX02: 11kV HV/0.415 kV 1500 kVA) and associated cabling to ensure reliable high-voltage supply.
- **Control Systems:** Specification of 690kV and 415kV LV switchboards to manage variable speed drives (VSDs), CO2 and ammonia compressors, pumps, heaters, harmonic controls, blowers, fans, cooling units, and sundry equipment.
- **On-Site Infrastructure:** Development of a new Motor Control Centre (MCC) switchroom to

centralize power distribution and control for the CO facility.

• **Testing and Commissioning:** Verification of electrical systems to ensure compliance with safety standards and operational requirements.

The electrical infrastructure will consist of the following pieces of key equipment:

- Transformer TX01: 11kV HV/0.690 kV 1500 kVA
- Transformer TX02: 11kV HV/0.415 kV 1500 kVA
- 690kV LV Switchboards to feed VSDs, CO₂ & Ammonia Compressors and Pumps.
- 415kV LV Switchboards for Harmonic Controls, Heaters, Blower Fans, Cooling Units, and other sundry equipment

A new on-site MCC electrical switchroom will be installed to manage power distribution for the CO facility.

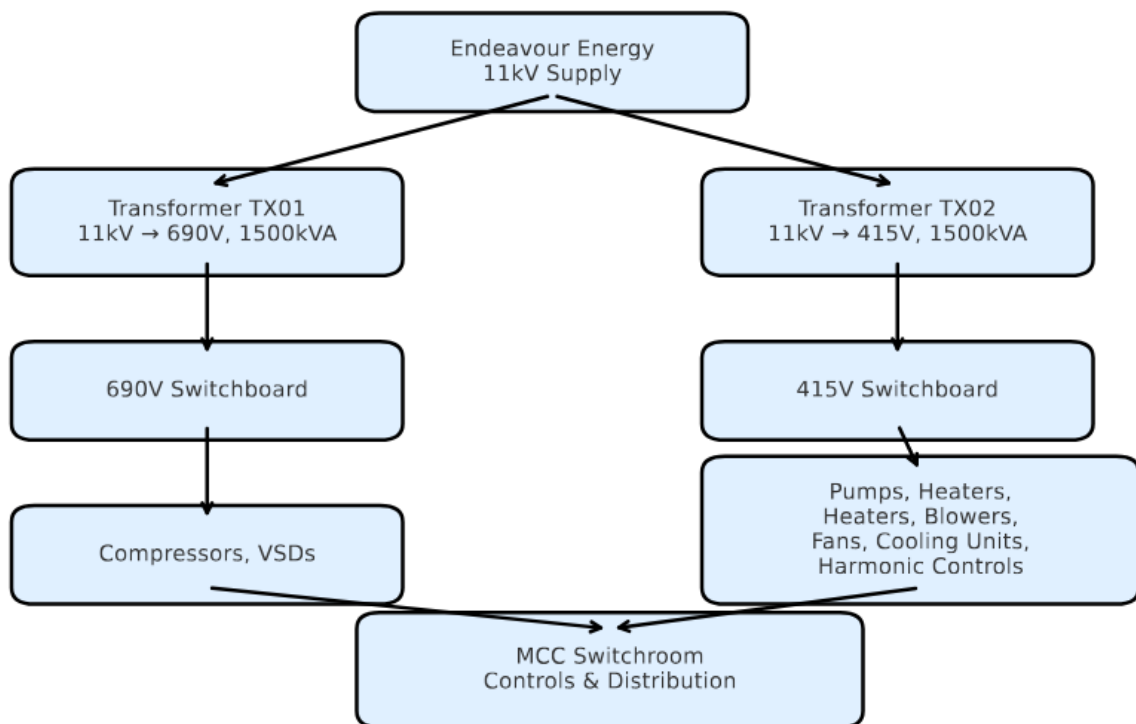


Figure 4, Diagram of Electrical Infrastructure.

3.2 Water Supply

It is planned to connect to the main town water. Potable water will be sourced from the mains supply for use in the office and amenities. Nominally the plant will be operated by between one and two operators.

3.3 Wastewater & Recycled Water

The facility is designed to prioritise water efficiency, with process water largely recirculated.

Excess water expected to be generated by the process at a rate of 100kg/hour. This water will be repurposed for non-potable uses such as washdown, irrigation of landscaping, toilet flushing, and general on-site use, (**waste stream 202 PFD Reference**). Any unused water will be returned with the waste stream to the Manildra Waste Processing facilities across the road.

3.3.1 Impact on Manildra Wastewater Treatment Facility

The Manildra Shoalhaven Starches Wastewater Treatment Facility has a current capacity to treat **10 million litres (10,000 kL)** of production wastewater daily, as reported in the Manildra Group Sustainability Report 2024 (page 67). The CO₂ Production Facility is expected to contribute approximately **14.3 kL/day of wastewater**, representing only **0.143%** of the existing treatment capacity.

This additional load is negligible and well within the facility's operational limits, with no augmentation required to accommodate the project's contribution.

A dedicated service agreement with Manildra will outline maintenance responsibilities for the return line and monitoring protocols, with SCADA integration for real-time flow and quality tracking. Regular coordination meetings will ensure ongoing alignment, and compliance with the Shoalhaven Starches and the Environment Protection Agency will be maintained through quarterly reporting to relevant authorities.

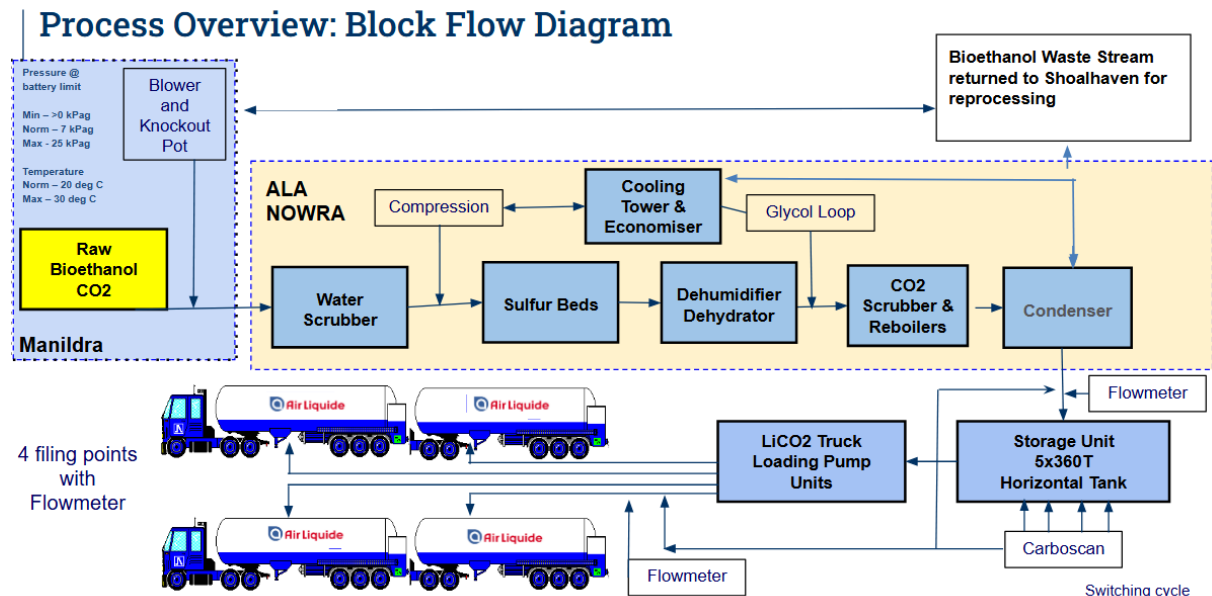


Figure 5, Process Overview.

3.4 Telecommunications

A standard NBN connection will be extended to the site for operational control, SCADA monitoring, and remote access. Minimal bandwidth is required beyond standard data telemetry.

3.5 Other Services

Stormwater from new hardstand areas will be directed to an on-site stormwater retention and quality control system, complying with council requirements, (see the image above).

4. Staging, Coordination & Delivery

4.1 Infrastructure Delivery Strategy

Infrastructure works will be completed in alignment with the broader project construction phases:

- **Stage 1:** Utility relocation and site preparation, raw gas line.
- **Stage 2:** Civil works, Installation of underground services and electrical switchrooms.
- **Stage 3:** Plant installation, tie-in, lagging and commissioning.

4.2 Service Provider Coordination

Preliminary discussions with **Endeavour Energy** and **Shoalhaven Water** have confirmed no significant capacity constraints for the proposed development, subject to detailed design and augmentation works as outlined in Section 3.1 above.

4.3 Coordination, Funding, Timely Delivery, and Maintenance of Upgrades

To ensure the proposed upgrades to utility infrastructure—both on-site and to public facilities—are coordinated effectively, fully funded, delivered on schedule, and maintained for the long-term operation of the CO₂ Production Facility, Air Liquide Australia has developed a comprehensive strategy in consultation with relevant service providers (Endeavour Energy, Shoalhaven Water, and telecommunications providers). This approach aligns with the project's overall construction timeline and regulatory requirements, minimizing disruptions to existing public networks while facilitating seamless development.

Coordination:

All upgrades will be coordinated through early and ongoing engagement with utility providers, commencing with formal discussions which are already underway (as noted in Section 4.2). Letters of intent, technical scoping documents, and joint planning workshops will be established to align works with provider schedules and capacity assessments. For public facility upgrades (e.g., augmentation of Endeavour Energy's 11kV HV distribution network or Shoalhaven Water's wastewater pipelines), Air Liquide will submit applications for connection

agreements and work approvals in Q2 2026, in line with provider protocols. On-site upgrades, such as the installation of transformers and MCC switchrooms, will be integrated with third-party contractors (e.g., certified electrical firms) via a centralized project management team. A dedicated Utility Coordination Plan will oversee interfaces, including utility surveys, and mitigation of construction impacts on public assets (e.g., temporary protections for below-ground services). This ensures compliance with standards like **AS/NZS 3000:2018** and local council requirements.

Funding:

Air Liquide Australia will fully fund all required upgrades, with no reliance on public or third-party contributions. The total budget for utility infrastructure, including public facility augmentations, is allocated within the project's capital expenditure framework. For example, \$269,500 has been specifically budgeted for HV infrastructure upgrades (e.g., dedicated 11kV/690V and 11kV/415V transformers and associated network reinforcements with Endeavour Energy). Additional funding covers wastewater pipeline extensions, potable water connections, and telecommunications tie-ins. Budget oversight will be managed through quarterly reviews by the project finance team, with contingency allowances (10-15%) for unforeseen provider-mandated changes. All expenditures will be transparent and auditable, with progress reports shared with stakeholders.

Timely Delivery:

Upgrades will be delivered in alignment with the project's three-stage construction phases (Section 4.1), ensuring completion ahead of plant commissioning targeted for Q2 2027.

Stage 1 (utility relocation and raw gas line) includes initial public connection scoping by early of 2026;

Stage 2 (underground services and electrical switchrooms) targets Q2 2026 for HV augmentations; and

Stage 3 (tie-in and commissioning) incorporates final testing. Lead times from providers (e.g., 3-6 months for Endeavour Energy approvals) have been factored into the critical path schedule, developed using project management tools like Primavera P6. Milestones will be monitored via weekly progress meetings, with contractual penalties for delays applied to contractors. This phased approach guarantees on-time delivery without compromising public service reliability.

Maintenance:

Post-commissioning, all upgrades will be maintained to ensure ongoing reliability and compliance with operational demands. Air Liquide will establish an in-house maintenance program, including annual integrity inspections for electrical and pipeline assets, routine SCADA (PI Vision) monitoring for telecommunications and control systems, and scheduled servicing of stormwater and wastewater infrastructure.

For public facility components (e.g., shared HV connections), a long-term service agreement with Endeavour Energy will outline shared maintenance responsibilities, with Air Liquide funding any facility-specific elements. Predictive maintenance tools (e.g., vibration monitoring for sumps and valves) and a 24/7 response team will minimize downtime, targeting 99.9% uptime. Compliance with Australian standards (e.g., **AS 2885 for pipelines**) and environmental regulations will be verified through third-party audits, with records retained for 10+ years.

This strategy provides assurance that upgrades will support the development without adverse impacts on public facilities, demonstrating Air Liquide's commitment to sustainable and efficient infrastructure delivery.

5. Impacts on Existing Infrastructure & Mitigation Measures

5.1 Potential Impacts

Construction activities may temporarily affect:

- Temporary disruption to access routes for approximately 18 weeks during pipeline trenching.
- Below-ground assets (e.g. water mains, HV cables)

Operationally, no adverse impacts to external services are expected, as utility demand is moderate and service augmentation has been planned.

Table 1: Risk Matrix for Raw Gas Pipeline

Risk Description	Likelihood	Consequence	Risk Level	Residual Risk	Proposed Mitigation
Pipeline leakage or rupture (e.g., due to pitting/crevice corrosion in stainless steel sections, external damage during construction, or pressure surges from ethanol-rich CO ₂).	Medium	High	High	Low	Regular integrity inspections using non-destructive testing (e.g., ultrasonic); install pressure relief valves and automated shut-off systems; conduct hydrotesting pre-commissioning; apply corrosion-resistant coatings (e.g., epoxy) on above-ground stainless steel sections.
Release of ethanol vapors or CO ₂ (e.g., environmental/safety impact like asphyxiation or greenhouse gas emission).	Low	High	Medium	Low	Implement gas detection sensors along the pipeline route; develop an emergency response plan with spill containment; use HDPE for underground sections to minimize permeation; recycle captured gas to reduce venting.
Damage during installation (e.g., directional drilling under easements causing misalignment or strikes on existing utilities).	Medium	Medium	Medium	Low	Pre-construction utility surveys (Dial Before You Dig, ground-penetrating radar); employ experienced directional drilling contractors; stage works to avoid peak traffic on Bolong Rd; monitor vibration and alignment in real-time.
Blockage or failure at low-point sumps/scour valves (e.g., moisture buildup leading to corrosion or operational downtime).	Medium	Low	Low	Low	Design sumps with easy-access drainage and corrosion-resistant materials; schedule routine maintenance (e.g., quarterly inspections and flushing); integrate SCADA monitoring for early detection of pressure anomalies.
Traffic or community disruption (e.g., during easement works for the ~1400m route, including crossings).	Low	Medium	Low	Low	Develop a Traffic Management Plan with signage and detours; limit works to off-peak hours; consult with local stakeholders (e.g., Shoalhaven Council) for approvals; use minimally invasive methods like sleeved HDPE for road crossings.

5.2 Mitigation Measures

- Dial Before You Dig and utility location surveys will precede any excavation.
- Groundpenetrating radar and underground cable locator (wand) will precede excavations.
- Existing utility alignments and underground services will be identified and protected.
- Construction Environmental Management Plans (CEMP) will address service protection.

6. Construction Methodology: Raw Gas Pipeline Road Crossings and Wastewater Pipeline (Bolong Road Crossing)

Overview The liquid waste return line connecting the Air Liquide CO2 facility to the Shoalhaven Starches treatment plant will be installed using **Horizontal Directional Drilling (HDD)**. This trenchless construction method is specifically selected to eliminate the need for open-cut excavation across Bolong Road, thereby ensuring that the road surface remains intact and traffic flow is not physically obstructed.

Step-by-Step Methodology and Traffic Mitigation

1. **Site Establishment and Setup:** Construction will be staged to occur entirely within the development boundary and the receiving industrial site.
 - The "launching pit" and "receiving pit" will be located on private property set back from the Bolong Road shoulder. This ensures all heavy machinery, such as the drill rig and mud management systems, operates clear of the public carriage-way.
2. **Pilot Bore and Real-Time Monitoring:** A steerable pilot hole will be drilled along a predetermined path beneath the road at a depth that exceeds standard utility requirements.
 - To prevent any risk to road integrity, the drilling team will use real-time tracking to monitor alignment and vibration.
 - Pre-construction utility surveys, including **Ground Penetrating Radar (GPR)** and **Dial Before You Dig**, will be conducted to map existing below-ground assets and ensure the drill path avoids any interference with existing water mains or HV cables.
3. **Sleeved HDPE Installation:** Once the pilot hole is complete, the bore will be enlarged, and a **sleeved High-Density Polyethylene (HDPE) pipe** will be pulled through.
 - The use of a sleeved pipe provides an extra layer of protection for the road infrastructure and simplifies future maintenance without requiring further excavation.
4. **Zero-Disruption Traffic Management:** Since the drilling occurs entirely underground, Bolong Road will remain fully operational for all vehicle classes, including heavy industrial transport, throughout the construction phase.
 - There will be no physical trenching across the road surface, meaning no lane closures or "Stop/Slow" traffic control are required for the pipeline installation itself.
 - Any peripheral activities will be limited to off-peak hours to ensure that the surrounding industrial transport network remains unaffected.

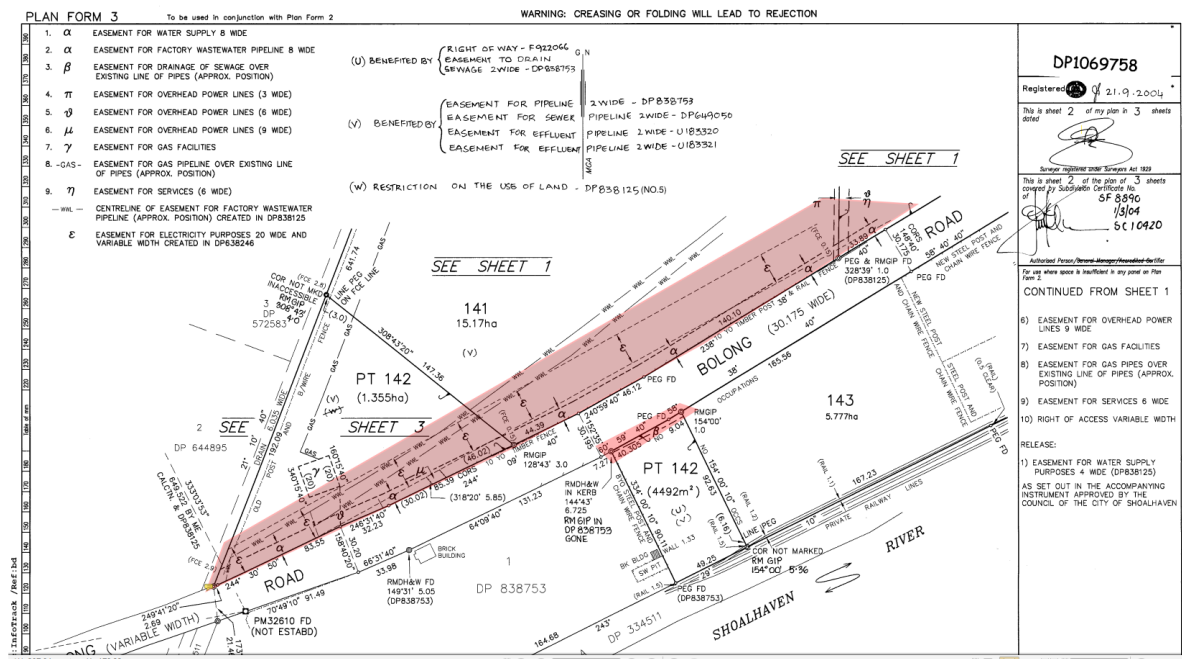
While initial assessments noted a potential for minor disruptions, the refinement of the HDD methodology ensures that the 18-week construction window for the wastewater line will not result in any physical closure or meaningful impedance of traffic on Bolong Road. Crucially, it has been confirmed that all HDPE pipe can be moved and positioned using earth-loading equipment operated entirely from private land, ensuring zero disruption to public traffic flow.

All upgrades are designed to be delivered in a staged, integrated manner to avoid any disruption to the surrounding area.

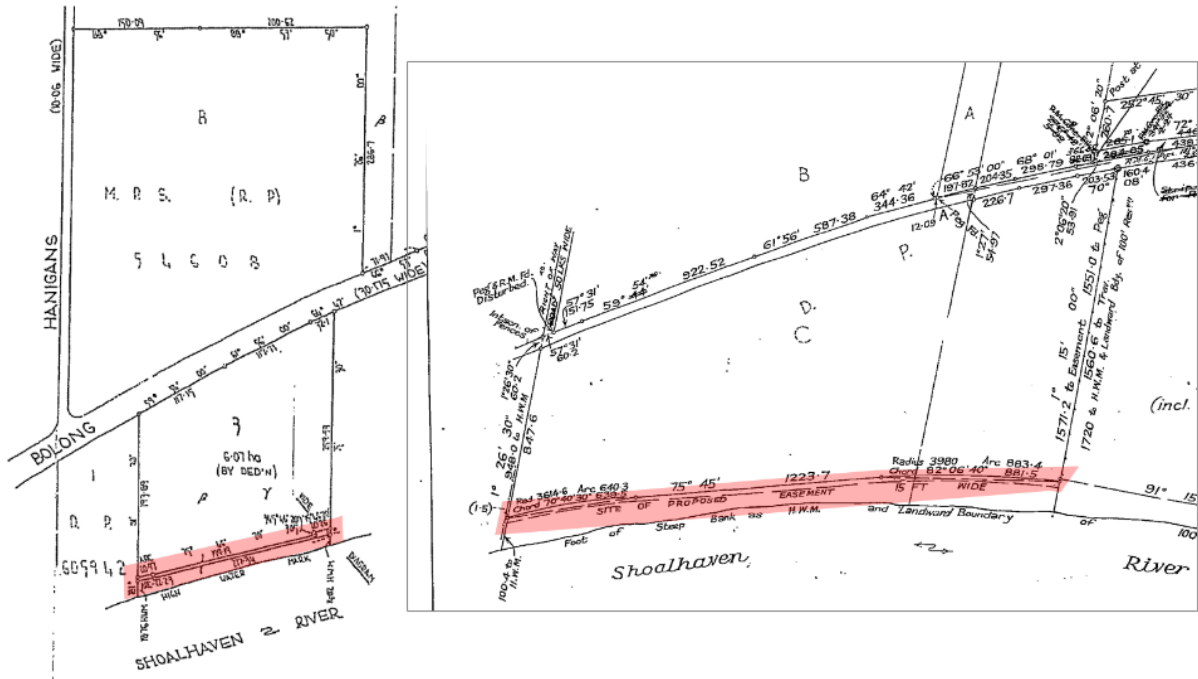
6.1 Impacts on Existing Infrastructure

The proposed raw gas pipeline will convey raw gas from the Shoalhaven Starches facility to the new Air Liquide CO₂ Production Facility. The alignment is located entirely within private industrial land, running inside the existing fenceline parallel to Bolong Road and **clear** of the registered easements that runs between the fenceline and the public road reserve as detailed below:

Lot 143 DP 1069758: Multiple service and sewer pipeline easements (including the 4 m wide easement marked 'S' and variable-width easements marked 'S1'/'S2' acquired by Shoalhaven City Council).



Lots 5 & 6 DP 621040, Lot 1 DP 605942 and Lot 4 DP 610696: Contain an easement for tree planting (4 m wide) together with rights of carriageway / right of way (roughly 6 m wide). This easement is located at a significant distance from an proposed works.



Lot 3 Sec 1 DP 3885, Lot 1 DP 544730 & Lot A DP 384559 have no registered easements shown on the Deposited Plan.

The raw gas line has been deliberately aligned to run clear of these existing easements to the maximum extent practicable. The buried pipeline will be installed at appropriate depths and will not interfere with the ongoing function of existing utilities, tree-planting easements or rights of carriageway.

Air Liquide will undertake detailed pre-construction surveys (including Dial Before You Dig and ground-penetrating radar) and will liaise with the benefiting parties of any proximate easements. Where required, a new easement in gross will be created and registered over the pipeline corridor to secure legal tenure for construction, operation and future maintenance of the raw gas line.

No impacts to public infrastructure or third-party assets within the Bolong Road road reserve are anticipated, as all works remain on private land.

(The wastewater return line will cross Bolong Road via Horizontal Directional Drilling (HDD) and will be addressed separately through an occupancy permit under the Roads Act.)

This approach ensures the project has negligible impact on existing land tenure arrangements while providing secure, long-term access for the raw gas infrastructure.

7. Conclusion

The CO₂ production facility will be serviced by reliable, fit-for-purpose utility infrastructure coordinated with existing industrial services. All upgrades will be delivered in a staged and integrated manner to avoid disruption to the surrounding area. The project aligns with the SEARs infrastructure requirements and demonstrates a proactive approach to planning, delivery, and management of essential services.